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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/942,784	08/31/2001	Tae-Woong Kang	0630-1187P	9755

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EXAMINER

CHEN, KIN CHAN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 02/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/942,784	Applicant(s) KANG, TAE-WOONG	
	Examiner Kin-Chan Chen	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20 is/are allowed.
- 6) ☒ Claim(s) 1-5, 11-15 and 17-19 is/are rejected.
- 7) ☒ Claim(s) 6-10 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Drawings***

1. Figures 1A-1G should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

2. Claims 17 and 19 are rejected under 35 U.S.C. 112, first paragraph. The process steps of forming non-sharp upper edges of the conductive layer is essential to the practice of the invention, but not included in the claim(s). See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

Claims 17 and 19 do not set forth process steps involved in the method/process of forming non-sharp upper edges of the conductive layer. Therefore, Claims do not reasonably provide enablement for one skilled in the art to perform same function and effect.

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3. Claims 11, 14, and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 recites the limitation "the selectively etching step" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim 14 recites the limitation "wet station" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 15 recites the limitation "wet station" in line 1. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

4. Claims 1, 5, 11, and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by admitted prior art.

In a method for forming a capacitor of a semiconductor device, admitted prior art teaches that a first, second, and a third insulation layer may be formed sequentially on a semiconductor substrate (Fig. 1A). The third and the second insulation layer may be sequentially etched to form at least one hole over a first region of the semiconductor substrate (Fig. 1B). A conductive layer may be formed over the semiconductor substrate (Fig. 1C). CMP may be performed until an upper surface of the third insulation layer is exposed (Fig. 1E, page 2 of the specification, lines 8-10). Portions of the third insulation

layer may be removed from the first region (Fig. 1F and 1G). As to dependent claim 5, admitted prior art teaches said material (pages 2 of the specification, line 16).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-4, 17, and 19 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over admitted prior art.

In a method for forming a capacitor of a semiconductor device, admitted prior art teaches that a first, second, and a third insulation layer may be formed sequentially on a semiconductor substrate (Fig. 1A). The third and the second insulation layer may be sequentially etched to form at least one hole over a first region of the semiconductor substrate (Fig. 1B). A conductive layer may be formed over the semiconductor substrate (Fig. 1C). CMP may be performed until an upper surface of the third insulation layer is exposed (Fig. 1E, page 2 of the specification, lines 8-10). Portions of the third insulation layer may be removed from the first region (Fig. 1F and 1G).

Admitted prior art teaches the second insulation material may be silicon nitride and the third insulation material may be silicon oxide (pages 2 of the specification, line 20-23). Because same materials are used in the same process, it would inherently

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contain same etching properties (having different characteristic with respect to each other in instant claim 2) and same functions (produce non-sharp upper edges of the conductive layer in claims 17 and 19).

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art.

Admitted prior art does not explicitly state that the slurry material may be removed from the first region. However, it would have been obvious to one with ordinary skill in the art to clean (remove) the slurry in the device because it is conventional to keep the semiconductor device as clean as possible and remove unneeded material for the product during semiconductor device fabrication.

7. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art in view of Matsuoka et al. (US 5,130,449; hereinafter "Matsuoka").

The discussion of modified Matsuoka from above is repeated here.

Claim 13 differs from admitted prior art by specifying using wet etching for removing the insulation material over a conductive material. However, it is conventional to use wet etching method for removing the insulation material over a conductive material. Matsuoka is only relied on to show this conventional method (col. 12, lines 10-13). Because it is conventional and because it is disclosed by Matsuoka, hence, it would have been obvious to one with ordinary skill in the art to modify the method of admitted prior art by using wet etching method for removing the insulation material over a conductive material in order to provide their art recognized advantages and produce an expected result.

As to dependent claims 14 and 15, Matsuoka is not particular about the wet station being used in the wet etching process. Hence, it would have been obvious to one with ordinary skill in the art to use wet station employing an IPA vapor drier because it is one of the most popular wet station for wet etching process.

***Allowable Subject Matter***

8. Claim 20 is allowed.

Claims 6-10 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

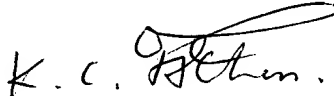
The following is a statement of reasons for the indication of allowable subject matter: The references of record do not teach or suggest a method for forming a capacitor comprising: after etching, the thickness of the third insulation layer over the second region is thinner than a thickness of the third insulation layer over the first region (claim 6); or etching the hard mask film using the photoresist pattern as a mask and etching the third and second insulation layers using the etched hard mask and the photoresist pattern.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's

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supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.

K-C C  
February 20, 2003

  
Patent Examiner  
Group Art Unit 1765